This listing of the claims replaces all prior versions in the application.

Listing of Claims:

1. (Currently Amended) A low profile acoustic sensor array, comprising:

a plurality of discrete aligned spaced apart conformable acoustic sensor element pads, each including an active sensing element comprising piezoelectric material, wherein each sensor element pad is conformable to a shape of an underlying structure, and wherein, in operation, the sensor element pads are configured to generate a respective electrical signal in response to flexure induced by acoustic signals; and

at least one longitudinally extending elongate strip integrally attached to at least one of the plurality of acoustic sensor pads, the elongate strip having a length with opposing first and second end portions, the elongate strip comprising at least one discrete electrical transmission path thereon, the second end portion of the elongate strip adapted to connect to an output device, wherein a respective elongate strip is configured so that the at least one integrally attached acoustic sensor element pad extends outwardly away from the primary direction of the strip, the number of discrete electrical transmission paths on the strip corresponding to the number of acoustic sensor element pads held by the strip with a respective acoustic sensor element configured to be in electrical communication with a respective electrical transmission path.

~~a plurality of longitudinally extending sensor strips, each of said strips having at least one sensor element included thereon, wherein said at least one sensor element is configured so as to respond to acoustic wavelengths in the frequency range of interest and to inhibit response to compressional wavelengths in the frequency range of interest so as to mechanically filter acoustic signals detected by the sensor array~~.

2. (Currently Amended) A low profile acoustic sensor array, comprising:

a plurality of longitudinally extending sensor strips, each of said strips having at least one sensor element included thereon, wherein said at least one sensor element is configured so as to respond to acoustic wavelengths in the

frequency range of interest and to inhibit response to compressional wavelengths in the frequency range of interest so as to mechanically filter acoustic signals detected by the sensor array. ~~A low profile acoustic sensor array according to Claim 1,~~

wherein each of said plurality of longitudinally extending sensor strips comprise:

a plurality of longitudinally spaced apart separate sensor elements included thereon;

a sensor frame having a length and at least one longitudinally extending frame rail;

wherein each of said plurality of acoustic sensor elements attached to said at least one frame rail, wherein each of said acoustic sensor elements is sized and configured to extend transversely from said frame rail, and wherein each of said sensor elements have a pliable configuration; and

a plurality of separate electrical signal paths, at least one for each of said sensor elements, said electrical signal paths defining a signal path from a respective one of each of said sensor elements to a desired end electrical termination point.

3. (Currently Amended) An acoustic sensor array according to Claim 1, wherein each of said strips comprise a plurality of sensor elements, wherein each of said strips ~~frame~~ include[[s]] first and second transversely opposing frame rails, wherein said opposing rails are spatially separated along a major portion of said frame length, wherein each of said sensor elements is sized and configured to extend between said sensor frame opposing rails, ~~and~~ wherein each of said sensor elements is attached to a selected one of said frame rails, wherein the strip comprises an elongate medially located neck portion that extends longitudinally away from the frame rails, the neck portion having a first width that merges into the frame rails that span a second larger width, and wherein a respective electrical transmission path on the strip laterally extends outward from a corresponding acoustic sensor element pad then turns to extend longitudinally about the one

longitudinally extending rail, then laterally turns inward a distance and extends longitudinally along the neck portion.

4. (Original) An acoustic sensor array according to Claim 2, wherein each of said strips is a unitary body along a major portion of its length, and wherein each of said sensor elements laterally extends from one of said at least one frame rails such that said sensor elements in each strip are linearly aligned along the length of said strip.

5. (Original) An acoustic sensor array according to Claim 3, wherein said sensor elements are arranged on said frame such that adjacent sensor elements are attached to different sides of said frame rails.

6. (Original) An acoustic sensor array according to Claim 2, said frame rails and said sensor elements have an upper surface, and wherein said upper surface of said frame rails and said sensor elements have a substantially constant and flat contour when viewed from the side when positioned on a subject.

7. (Original) An acoustic sensor array according to Claim 2, wherein said sensor array further comprises a plurality of discrete masses, one positioned on each of said sensor elements.

8. (Original) An acoustic sensor array according to Claim 6, said strip further comprising a longitudinally extending neck portion having opposing first and second ends, wherein said sensor element frame is attached to said neck portion first end and said termination point is an electrical connector positioned adjacent said neck second end.

9. (Original) An acoustic sensor array according to Claim 2, wherein each of said sensor elements comprises a first PVDF layer overlying and contacting a

second flexible core layer and a third PVDF layer opposing said first layer and contacting said core layer.

10. (Original) An acoustic sensor array according to Claim 9, wherein said electrical signal paths are formed by a conductive pattern formed onto said first and second PVDF film layers.

11. (Original) An acoustic array according to Claim 8, wherein said frame rails comprise a first PVDF layer, a second intermediate core layer, and a third PVDF layer, wherein said first and third PVDF layers sandwich said second core layer.

12. (Original) An acoustic array according to Claim 10, wherein said frame rails and said sensor elements comprise the same multi-layer materials in the same thicknesses.

13. (Original) An acoustic array according to Claim 9, wherein said first layer PVDF is selectively actively polarized about portions of sensor elements and substantially non-actively polarized about said frame sides to provide increased signal isolation

14. (Original) An acoustic array according to Claim 2, wherein said plurality of strip arrays is four.

15. (Original) An acoustic array according to Claim 13, wherein said plurality of sensor elements is six.

16. (Original) An acoustic array according to Claim 9, wherein said core layer comprises neoprene.

17. (Original) An acoustic array according to Claim 11, wherein said electrical signal path is defined by two spatially separate opposing electrical traces formed onto said first and third PVDF layers, said separate electrical traces including a first electrical linear trace with a first rectangular sensor element region and a corresponding second linear trace with a second rectangular sensor element region, wherein said first electrical linear trace and first rectangular region disposed onto said first PVDF layer and said second electrical linear trace and second rectangular region disposed onto said third PVDF layers.

Claims 18 – 23 (Cancelled).

24. (Original) An acoustic sensor according to Claim 17, wherein said operational frequency range includes at least the frequency range of about 100 to 1000 hertz.

25. (Original) An acoustic sensor according to Claim 24, wherein said sensor generates a response during flexure which has an output substantially equal to the voltage differential between said first and second voltages.

26. (Currently Amended) An acoustic strip sensor array, comprising:

a sensor frame having a frame length and including at least one longitudinally extending rail;

a plurality of acoustic sensor elements attached to said rail, wherein said acoustic sensor element is sized and configured to extend a transverse distance away from said rail, said sensor element having a pliable configuration; and

first and second opposing spatially separate electrical signal paths for each of said sensor elements, wherein in response to flexure of said sensor elements, said first and second electrical signal paths are configured to provide opposing polarities defining a differential signal output for a respective one of each of said sensor elements, wherein said sensor array has an operational frequency range which includes the frequency range of about 100 to 1000 hertz.

27. (Original) An acoustic strip sensor array according to Claim 26, wherein said acoustic strip sensor array has a substantially planar profile along said frame and said sensor elements when viewed form the side.

28. (Original) An acoustic strip sensor array according to Claim 26, wherein said frame and said sensor elements are sized and configured to flex in response to movement associated with shear waves and to inhibit element flexure associated with long compression waves in the acoustic frequency range of interest.

29. (Original) An acoustic strip sensor array according to Claim 26, wherein when engaged on the surface of a patient, said sensor elements flex in response to acoustic waves having a propagation velocity of less than about 100m/s, and wherein said sensor elements are sized and configured to inhibit flexure in response to acoustic waves having a propagation velocity longer than about 300 m/s.

30. (Original) An acoustic strip sensor array according to Claim 26, wherein said sensor elements and said frame elements comprise a resilient core layer and opposing first and second outer layers comprise PDVF.

31. (Original) An acoustic strip sensor array according to Claim 30, wherein said first and second electrical signal paths are positioned to be on internal surfaces of said first and second outer layers, positioned with respect so said core to face the other across the width of said core, such that, during operation and engagement with a patient, flexure of said sensor generates a first and second response voltage corresponding to a respective one of said first and second electrical signal paths, wherein said sensor array signal output for each sensor element is defined by the voltage differential between said first and second voltages.

32. (Original) An acoustic strip sensor array according to Claim 31, further comprising a plurality of discrete masses, at least one each attached to each of said plurality of acoustic sensor elements.

33. (Original) An acoustic strip sensor array according to Claim 30, wherein said core layer has a first relative permittivity and said first and second pliable material layers have a second relative permittivity such that said first relative permittivity is less than said second relative permittivity.

34. (Canceled).

35. (Original) An acoustic strip sensor array according to Claim 30, wherein said strip sensor array is configured such that said first and second electrical signal paths are defined by traces formed on the internal facing surfaces of said first and second outer layers, and wherein said signal paths include a ground plane defined by an electrical trace formed on the externally facing surfaces of said first and second outer layers.

36. (Currently Amended) An acoustic strip sensor array according to Claim 26, wherein said frame and said acoustic sensor elements define a unitary body <u>comprising spaced apart frame rails with the sensor elements disposed therebetween, wherein each of said sensor elements is attached to a selected one of said frame rails, wherein the unitary body comprises an elongate neck portion with a first width that merges into the frame rails that span a second larger width, and wherein a respective electrical transmission path for a sensor element laterally extends outward from a corresponding acoustic sensor element then turns to extend longitudinally about the one longitudinally extending rail, then laterally turns inward a distance and extends longitudinally along the neck portion</u>.

37. (Currently Amended) A method for fabricating the strip sensor array ~~of Claim 1~~, comprising ~~the steps of~~:

forming a unitary body strip sensor foundation layer having opposing major surfaces;

forming a series of proximately positioned non-contacting pads and a frame segment into the foundation layer;

positioning two separate opposing PVDF layers on opposing major surfaces of the foundation layer, the PVDF layers including two major surfaces and an electrical signal path formed on one surface and a ground path formed on the other; and

orienting the PVDF layers such that the electrical signal paths of each of the PVDF layers faces the foundation layer.

38. (Currently Amended) A method according to Claim 37, wherein the first forming step comprises forming a central neck portion that has a smaller width than the frame segment and merges into the frame segment, wherein said second forming step further comprises forming the frame segment to include two longitudinally extending opposing sides, and arranging the series of pads on the foundation layer to attach to at least one of the two opposing sides and to transversely extend between the two sides.

39. (Original) A method according to Claim 38, wherein said positioning step is performed by disposing a series of electrically separate external traces onto a first major surface of the PVDF layers, the electrical traces including a linear extending signal path and an electrode region corresponding to the sensor element pads.

40. (Original) A method according to Claim 39, further comprising the step of disposing a series of discrete masses onto an exposed surface of one of the PVDF layers.

41. (Original) A method according to Claim 37, wherein the PVDF layers are configured to provide output voltages of opposing polarities in response to a flexure input.

42. (Original) A method according to Claim 37, wherein predetermined portions of the longitudinally extending sides are selectively polarized.

43. (Original) A method according to Claim 37, wherein said PVDF layer electrical traces are formed by disposing a conductive layer in a predetermined conductive pattern thereon.

44. (Currently Amended) A method of detecting acoustic wave signals to identify the condition of a patient's coronary arteries, ~~using the sensor array of Claim 1,~~ comprising the steps of:

positioning a sensor array having a plurality of pliable sensor elements and first and second opposing piezoelectrically active layers positioned over a center neutral core onto a patient's exposed surface in a chest region of interest;

securing each of said plurality of sensor elements to the patient such that they are conformal to the surface of a patient;

flexurally displacing at least one sensor element in response to a detected shear wave in an acoustic frequency of interest, the flexural displacement generating a first voltage having a first polarity associated with said first piezoelectric active layer and a second voltage having an opposing polarity associated with said second piezoelectric active layer; and

combining the first and second voltages to generate an output signal for the flexed sensor responsive to the change in curvature of the patient surface associated with the detected shear wave.

45. (Original) An acoustic sensor array, comprising:

a plurality of unitary acoustic sensor elements;

a plurality of transmission lines having opposing first and second ends and defining a length therebetween, a respective one transmission line for each of said plurality of unitary acoustic sensors, said transmission line first end individually attached to a respective one of said acoustic sensor elements; and

wherein each of said transmission lines is configured with a series of undulations along its length.

Claims 46 – 50 (cancelled).

51. (Original) An acoustic array according to Claim 45, further comprising a carrier member releasably attached to each of said sensor elements.

52. (Original) An acoustic array according to Claim 45, further comprising a plurality of discrete masses, at least one attached to each of said plurality of sensors.

53. (Original) An acoustic array according to Claim 52, wherein said discrete mass includes a reflective surface thereon.

54. (Currently Amended) An acoustic sensor array, comprising:

a plurality of unitary acoustic sensor elements;

a plurality of transmission lines having opposing first and second ends and defining a length therebetween, a respective one transmission line for each of said plurality of unitary acoustic sensors, said transmission line first end individually attached to a respective one of said acoustic sensor elements; and

wherein each of said transmission lines is configured with a series of undulations along its length ~~A sensor array according to Claim 45~~, wherein said sensor element comprises:

a resilient core layer comprising a low permittivity material having a core thickness;

a first pliable material layer sized and configured to sandwich and overlay said core layer, said first material layer comprising a piezoelectrically active material having opposing first and second major surfaces;

first and second electrical traces disposed on said first major surface of said first pliable material layer, said first and second electrical traces defining a spatially separate first and second electrode, wherein in position over said core, said first electrode has an opposite polarity relative to said second electrode; and

an exterior conductive shield layer sized and configured to overlay said second major surface of said first material layer;

and wherein said transmission line defines a linear transmission line attached to said sensor element, said linear transmission line including first and second ends and extending a linear length therebetween, comprising;

a first pliable material layer extending from said first end to said second end of said linear transmission line having opposing first and second major surfaces, said first pliable material layer comprising a piezoelectrically active material;

first, second, and third electrical traces disposed on said first pliable material layer in electrical communication with said sensor element first material layer electrical traces, said first and second electrical traces disposed on said first major surface and said third electrical trace disposed on said second major surface;

first and second layers of a non-conducting film configured and sized to respectively overlay a major portion of said first and second major surfaces of said first pliable material layer;

a first linear outer layer conductive strip configured and sized to overlay a major portion of first non-conducting film layer opposite said first major surface of said first pliable material layer; and

a second linear outer layer conductive strip configured and sized to overlay a major portion of said second non-conducting film layer opposite said second major surface of said first pliable material layer;

wherein said first pliable material layer of said transmission line and said first pliable material layer of said sensor element is a unitary layer, and wherein said third electrical trace of said first pliable material layer provides an electrical ground operably associated with said first and second conductive outer layers of said sensor.

55. (Original) An acoustic sensor according to Claim 54, wherein said transmission line is configured with a series of undulations along its length.

56. (Original) An acoustic sensor according to Claim 54, further comprising at least one discrete mass attached to said sensor element.

57. (Original) An acoustic sensor array, comprising:

a plurality of compliant sensor elements having first and second outer surfaces, said first outer surface configured to attach to a subject such that it is substantially conformal to the subject; and

a carrier member releasably attached to said second outer surface of each of said plurality of sensor elements to hold said plurality of sensors in alignment during positioning on a subject;

wherein said carrier member is disengaged from said sensor elements after said sensor elements are attached to a desired location on the subject without causing said sensor elements to move from the desired location.

Claims 58 – 65 (cancelled).

66. (Currently Amended) A method of forming an acoustic sensor ~~for an acoustic array of Claim 45~~, said acoustic sensor having a sensor pad region and a transmission line, comprising the steps of:

configuring a first unitary layer of PVDF film having first and second opposing major surfaces with a laterally extending region having a first width and a longitudinally extending region having a second width;

forming sensor element electrical traces onto the first major surfaces of the PVDF layer, the sensor electrical traces are arranged as a rectangular shape onto the lateral region of the PVDF layer such that the lateral region defines first and second separate electrode regions with opposing polarity;

forming electrical traces onto the longitudinally extending region of the first and second major surfaces of the PVDF layer to define three electrical paths, wherein the first and second paths are formed on one major surface to provide the electrical signal path for the first and second electrode regions, and wherein the third path is formed on the opposing major surface of the PVDF layer and is configured with a primary finger portion;

inserting a resilient core onto a surface of one of the electrode regions;

positioning non-conducting film to overlay substantially the entire length of the longitudinally extending region of the PVDF layer;

positioning a first electric shield material to overlay the non-conducting film on the side opposing the first major surface of the PVDF film, wherein the first electrical shield includes a conductive secondary finger portion;

providing a second electric shield layer configured and sized to mirror the PVDF film shape, to overlay the second major surface of the PVDF film in the laterally extending electrode region and to overlay and contact the non-conducting film in the longitudinally extending region;

folding the laterally extending region of the PVDF film over the core such that the first and second electrode regions are positioned opposing the other with the core is positioned intermediate thereof; and

folding the primary finger of the ground strip to overlay the first major surface, wherein electrical contact between the first and second conductive shield material at the termination end thereby provides a substantially continuous electric shield for the sensor.

67. (Original) A method according to Claim 66, further comprising the step of forming undulations along a portion of the length of said longitudinally extending region.

Claims 68 - 69 (canceled).

70. (Previously Presented) A method of arranging a flexible sensor array on a subject, wherein said sensor array has a plurality of discrete sensor elements associated therewith and a unitized carrier member holding the sensor array in predetermined alignment, comprising the steps of:

arranging the discrete sensor elements of the array onto the patient while the carrier member holds the sensor elements in predetermined alignment;

securing the sensor elements to the skin of the subject in desired locations; and

subsequently removing the carrier member by peeling the carrier member away from the top surface of the sensor elements, leaving the sensor elements in alignment on the patient.

Claims 71 – 73 (canceled).

74. (New) A method according to Claim 70, wherein said sensor array includes a plurality of transmission lines, one attached to each of said sensor elements, and wherein said transmission lines are configured with a series of undulations thereon.

75. (New) A method according to Claim 70, wherein each of said sensor elements include at least one discrete mass positioned on an outer surface thereof such that it is attached to said sensor element and in contact with said unitized carrier member prior to the mechanical separation.

76. (New) A method according to Claim 75, wherein a predetermined number of said discrete masses includes a reflective surface thereon.

77. (New) A low profile acoustic sensor array, comprising:

a plurality of longitudinally extending sensor strips, each of said strips having at least one sensor element included thereon, wherein said at least one sensor element is configured so as to respond to acoustic wavelengths in the frequency range of interest and to inhibit response to compressional wavelengths in the frequency range of interest so as to mechanically filter acoustic signals detected by the at least one sensor element,

wherein said at least one sensor element comprises:

a resilient core layer comprising a low permittivity material having a core thickness;

a first pliable material layer overlaying and contacting said core layer, said first material layer comprising a piezoelectrically active material, said first pliable layer having opposing internal and external surfaces;

a second pliable material layer overlaying and contacting said core layer opposing said first pliable material layer, said second pliable layer comprising a piezoelectrically active material and having opposing internal and external surfaces;

a first electrical trace disposed on said first pliable material layer inner surface; and

a second electrical trace disposed on said second pliable material layer inner surface such that said first and second electrical traces face each other across said core layer, wherein during operation and in response to flexure of said sensor element, said first and second electrical traces generate respective first and second voltages, and wherein said first and second voltages have opposing polarity.

78. (New) An acoustic sensor array according to Claim 77, wherein said core layer comprises neoprene.

79. (New) An acoustic sensor array according to Claim 77, wherein said core thickness defines the separation distance between said first and second pliable layers.

80. (New) An acoustic sensor array according to Claim 79, wherein said first and second pliable material layers are formed from PVDF.

81. (New) An acoustic sensor array according to Claim 78, wherein said core layer has a first relative permittivity and said first and second pliable material layers have a second relative permittivity, such that said first relative permittivity is at less than said second relative permittivity.

82. (New) An acoustic sensor array according to Claim 80, wherein said core layer has a thickness of about 30 microns, and wherein said first and second pliable layers have a thickness of about 600 microns.

83. (New) An acoustic sensor array according to Claim 45, wherein said array is configured such that each of said unitary sensor elements are structurally separate and discrete from the others along the sensor element and transmission line.

84. (New) An acoustic sensor array according to Claim 83, wherein said undulations are formed onto said transmission lines as a series of continuously repeating pleated segments.

85. (New) An acoustic sensor array according to Claim 45, wherein said plurality of elements comprises three linearly arranged substantially flat elements.

86. (New) An acoustic sensor array according to Claim 83, further comprising a connector configured to receive a portion of each of said transmission line second ends therein.

87. (New) An acoustic sensor array according to Claim 83, wherein said sensor element includes a piezoelectrically active film configured to define two spatially separated opposing electrode surfaces with opposing polarities, and wherein during operation said opposing electrode surfaces produce first and second voltages, respectively, and each of said sensor elements is configured to generate a signal output defined by the voltage differential between said first and second voltages in response to flexure of said electrode surfaces.

88. (New) An acoustic sensor array according to Claim 57, wherein said carrier member includes an externally accessible tab.

89. (New) An acoustic sensor array according to Claim 57, further comprising a plurality of discrete masses, at least one attached to each of said sensor elements.

90. (New) An acoustic sensor array according to Claim 89, wherein a predetermined number of said discrete masses includes a reflective surface.

91. (New) An acoustic sensor array according to Claim 57, further comprising a plurality of discrete stiffeners, at least one attached to each of said sensor elements.

92. (New) An acoustic sensor array according to Claim 91, wherein a predetermined number of said stiffeners includes a reflective surface.

93. (New) An acoustic sensor array according to Claim 57, further comprising a plurality of transmission lines and a connector, wherein each of said sensor elements are operably associated with a respective one of said transmission lines, and wherein each of said transmission lines are connected to said connector.

94. (New) An acoustic sensor array according to Claim 93, wherein each of said transmission lines are configured with a series of undulations along its length.

95. (New) An acoustic sensor array according to Claim 57, said wherein said sensor elements comprise opposing first and second electrodes having opposing polarities and a center core having a thickness disposed therebetween, wherein said

electrodes are defined by a piezoelectrically active film and wherein said core thickness defines the separation distance between said first and second electrodes.

96. (New) A method of reducing the mechanical or electrical interference between one or more of adjacent sensors or undesired system or environmental mechanical input in a flexure responsive acoustic sensor array having a plurality of sensor elements and a plurality of transmission paths, comprising the step of forming a series of undulations in the transmission paths operably associated with the sensor elements to provide mechanical damping therealong.

97. (New) A method according to Claim 96, wherein the acoustic sensor array comprises a plurality of sensor elements and a separate electrical transmission path for each of said sensor elements, said method further comprising the step of forming the sensor array such that the plurality of sensor elements and associated sensor electrical transmission paths are physically separate units.